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ABSTRACT

The Internet, a major component of the information superhighway, has great promise for enhancing the capacity of schools to meet new learning and teaching requirements. In the first part of the video, the following six stories are presented showing students engaged in authentic tasks and collaborative learning with students and professionals around the world: (1) Madison Middle School 2000 in Madison, Wisconsin; (2) North Knox High School in Bicknell, Indiana; (3) Indianapolis Zoo in Indianapolis, Indiana; (4) Kelly High School in Chicago, Illinois, and its partnership with AT&T/Bell Labs in Naperville, Illinois, and Argonnne National Laboratory in Argonne, Illinois; (5) Model High School in Bloomfield Hills, Michigan; and (6) Steele Elementary School in Harrisburg, Pennsylvania. In the second part of the video, instructions are provided on getting started using the Internet in the classroom. First, two service providers explain the different options and requirements that need to be considered in order to gain access to the Internet. Second, possible ways to fund Internet plans are outlined. Third, staff development and its role in the success of integrating the Internet into the school or district is discussed. Finally, the issue of equity is explored--the need for all students to have access to the resources of the Internet. A bibliography lists 16 related resource books. A glossary of terms is included. (MAS)

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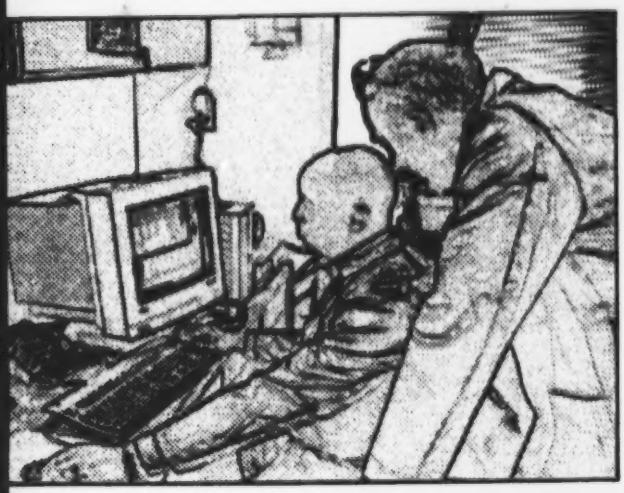
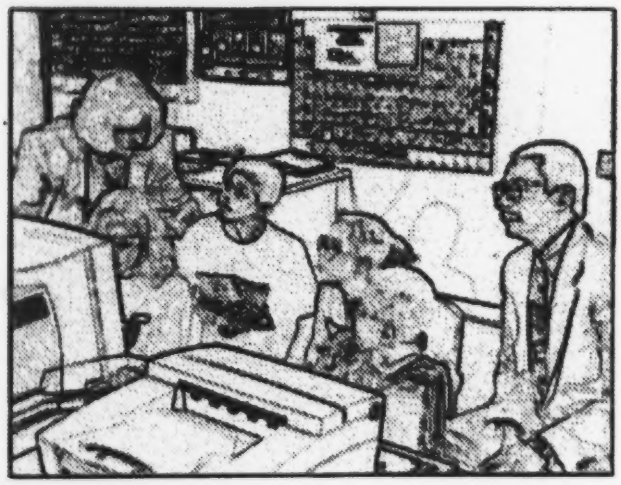
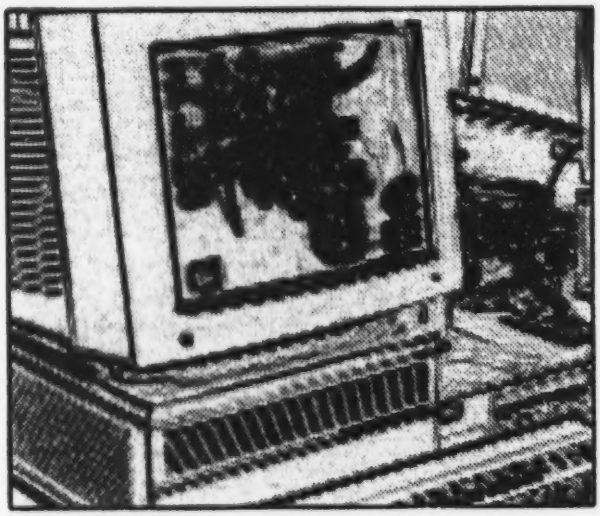
Learning With Technology

ED 386 167

Merging Onto the Information Highway







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Learning With Technology:
Merging Onto the Information Highway

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Table of Contents

Overview of the Program 1

What You Will See During the Program 3

An Inside Look at the Stories Featured in the Program 5

Possible Funding Sources 11

Access Options Matrix 12

Hints for Successful Staff Development 15

Getting Connected to the Internet 17

NCREL's Home Page 19

NCREL's Gopher 19

Helpful Products to Guide You 21

Reference 23

Resources 23

Glossary of Terms 25

Overview of the Program

A national movement to improve education is taking place across the country. Today's technical environment calls for teaching students additional basic skills, such as accessing information, manipulating that information, and applying it to solve problems. Researchers say that students need to learn these skills while involved in engaged learning (Jones, Valdez, Nowakowski, & Rasmussen). Engaged learners are responsible for their own learning, are energized by learning, are strategic, work collaboratively, and use what they have learned to solve real world problems.

The Internet, a major component of the information superhighway, has great promise for enhancing the capacity of schools to meet these new learning and teaching requirements. As you will see in the eight stories presented in the first part of this video, the students are indeed engaged learners. They work on authentic tasks and collaborate with other students and professionals around the world. This local and global communication and collaboration helps them appreciate and understand diverse viewpoints. Their excitement for learning is at a high level, and they are motivated to explore new avenues and possibilities. The students take charge of their learning, and as they actively solve problems their projects take on greater meaning. Their teachers serve as guides, learning and investigating with them.

By having the Internet in their classrooms, these schools are providing their students and teachers with a powerful tool for learning and teaching. In the video, you will meet students, teachers, and administrators who are excited to be exploring the Internet. Not only has it enabled them to take charge of their own learning, but it has changed the way they feel about coming to school each day.

In the second part of the video, you will learn how to get started. First, two service providers explain the different options and requirements that need to be considered in order to gain access to the Internet. Then you will learn about possible ways to fund your plans. Next you will hear about staff development and its role in your success in integrating the Internet into your school or district.

Finally, you will explore the issue of equity—the need for **all** students to have access to the resources of the Internet. As program host Charles Terrett explains, "If it is true that information is power, those who have access to information have an advantage over those who don't. Those who don't have access will not even realize what they're missing because the Internet is invisible; it's invisible unless your're on it."

What You Will See During the Program

1. Introduction by our host, Charles Terrett, Superintendent of Schools in Fulton County, Kentucky

2. Video stories:

   - Madison Middle School 2000 in Madison, Wisconsin
   - North Knox High School in Bicknell, Indiana
   - Indianapolis Zoo in Indianapolis, Indiana
   - Kelly High School in Chicago, Illinois, and its partnerships with AT&T/Bell Labs in Naperville, Illinois, and Argonne National Laboratory in Argonne, Illinois
   - Model High School in Bloomfield Hills, Michigan
   - Steele Elementary School in Harrisburg, Pennsylvania

3. Access Issues addressed by Marla Davenport from TIES in Roseville, Minnesota, and Betty Van Dam from MERIT Network in Ann Arbor, Michigan

4. Funding Issues addressed by Marla Davenport from TIES in Roseville, Minnesota, and Betty Van Dam from MERIT Network in Ann Arbor, Michigan

5. Staff Development Issues addressed by Linda Joseph from Columbus Public Schools in Columbus, Ohio

6. Equity Issues addressed by Gil Valdez from NCREL, Alda Hanna from Steele Elementary School, Dr. Offie Hobbs from Madison Middle School 2000, and Sam Bowen from Argonne National Laboratory

An Inside Look at the Stories Featured in the Program

Madison Middle School 2000 in Madison, Wisconsin

Madison Middle School 2000 (MMS 2000) is a culturally diverse experimental school that was established to explore new ways to teach and learn. One important decision MMS 2000 reached was to focus on using technology instead of textbooks. In fact, most of their classes don't even have textbooks. Instead, students are provided with a wide range of resources through the use of the Internet.

Recently, when the students were given an assignment to choose and research a topic on health and family issues, they headed not for the library, but for their computers. Using the Internet, they have been accessing information on topics such as cancer, teen pregnancy, chicken pox, and AIDS from the World Health Organization, the National Institutes of Health, and the White House. They also are communicating with others around the world using a software application called CU-SeeMe that allows them actually to see and hear each other. Barb Spitz, MMS 2000's Technology Coordinator, believes that this personal communication provides the students with something that they could never get by looking up information in a book.

MMS 2000 staff are convinced that one of the key components of their success is the partnerships they've established. One of these partners, the University of Wisconsin-Madison, helped MMS 2000 plan its infrastructure, install equipment, manage the facility, and train staff.

Both staff and students rate using the Internet as one of the best opportunities at their school. According to Spitz, "At this school, technology is intended to be used as a tool for learning, as opposed to a class that students go to where they learn about technology."

North Knox High School in Bicknell, Indiana

Students at North Knox High School look forward to coming to the library to explore the Internet. One student has found it a good place to share her poetry with others, and she especially enjoys hearing feedback from them. Others feel that research comes alive as they investigate hundreds of sources of information that their rural school could not possibly afford to house.

This adventure in learning started when Jan Weeks, the librarian, and Barb Singleton, the director of technology and curriculum, applied for a grant from the Indiana Department of Education. After attending a two-day training session on using

the Internet, Weeks was determined to convert her staff into Internet users. She started joining listservs and printing out information that teachers could use in their teaching. Soon the teachers were wondering where she was getting all of this inviting information. Jan was very willing to show them, so she began sharing what she knew about the Internet.

Now, the agriculture teacher, Bob Bobe, is trying out a hydroponics and aquaculture project with his students based on information he found on the Internet. The French class is writing to students in Belgium to practice what they are learning in class. The assistant principal is linking up with other administrators to find out about policies and issues at their schools.

All of the teachers, students, and administrators who have gotten hooked on the Internet at North Knox wish that they had more workstations with access in their building. Singleton believes that "the students are so involved in this kind of active learning because they can ask the questions they're interested in. They can search for answers. They can try to solve problems they're interested in, and that's what they're going to have to do all their lives."

Indianapolis Zoo in Indianapolis, Indiana

How does a metropolitan zoo suddenly find itself a key player in providing rich learning experiences for people around the world? For the Indianapolis Zoo, it all started with an invitation from the Indianapolis Department of Education to join other learning institutions on the Internet.

Excited at the prospect, zoo librarian Suzanne Braun quickly began setting up communications that would benefit not only students around the world, but visitors to the zoo as well. On one occasion, Braun noticed a posted message from a classroom in Kodiak, Alaska. She contacted the teacher and they formed a partnership to exchange information. The students in Alaska provide the zoo with information about the native wildlife on the island of Kodiak, and Suzanne, in turn, initiates them into the wonders of a zoo and lets them know what life is like in places other than their island. Because many of these students never get off of the island, finding out about the Indianapolis Zoo is exciting for them.

Yet another zoo project involves Ivor, a koala on loan at the zoo. Visitors come to observe Ivor and write questions which they leave in a box next to the exhibit. Suzanne sends those questions to students in Australia over the Internet and posts their responses on a bulletin board next to Ivor's area. By her own admission, Suzanne is thrilled to be using the Internet to promote learning for students all over the world: "We firmly believe as an educational commitment that we just cannot sit here and let the world come to us; we do have to reach out and bring the world in, and that's what we are trying to do."

Kelly High School in Chicago, Illinois

At Kelly High School in Chicago, learning has taken on a whole new dimension. Instead of having to rely solely on their textbooks for information, students head for the school's computers and a one-on-one dialogue with scientists, designers, engineers, and business executives. This ethnically diverse, overcrowded, inner-city school has provided its students with these collaborative opportunities through the Internet with AT&T/Bell Labs and Argonne National Laboratory.

Assistant Principal John Ruskamp sees a marked difference in the school since the advent of the Internet, both in the students—who are now competitive both in the job market and for college entrance—and in the teachers. Ruskamp explains, "They are now able to compete equally with students from more privileged schools. The teachers and students that use the Internet here at Kelly High School are more collegial. Often the teachers will come to the kids to find an answer, and conversely the students are learning side by side with the teachers as they jointly explore a whole new medium."

Getting his students involved with the Internet is a priority for Jerry Bokowy, chemistry teacher at Kelly and moderator for the Ask a Scientist Database, sponsored by Argonne National Laboratory. Bokowy's students use the Internet to conduct research for their science fair projects and for other areas of interest. "In some cases," says Bokowy, "some of the scientists have acted as mentors for students who are interested in a particular area or particular field, and these 'Ask a Scientist' questions sometimes light or ignite some of our students into getting interested in an area because they have gotten, not privileged information, but an inside feeling that they have talked to a real scientist." The students and staff at Kelly High School have developed positive relationships as they use the Internet to further their education.

AT&T/Bell Labs in Naperville, Illinois

When a Chicago inner-city high school formed a partnership with a suburban business, new doors and possibilities opened up for the students: They were offered an opportunity to work with a major corporation to learn real-life job skills at their school.

The corporation, AT&T/Bell Labs, located in a suburb 25 miles west of Chicago, formed a school/business collaboration with Kelly High School. Together, they use the Internet to communicate between the two sites. AT&T/Bell wanted to give the students an authentic experience in the business world, so the company identified a real problem to be solved at the high school: There was no communication system in the basement of the school. AT&T/Bell and the school set up a project in which the students could design a wireless communication system. The students were

divided into groups, each working with an AT&T/Bell professional and a teacher from Kelly. Each group was given responsibility for a specific part of the process: market analysis, requirement writing, design/development, and installation.

The students began their training by visiting AT&T/Bell Labs, and from that point on, all communication was through the Internet, conference calls, and facsimile. Students quickly learned that they had to adhere to the standards expected in the business world. All of their work had to be of a high quality. AT&T/Bell engineers took an interest in the students and coached them not only on the project, but on personal interests such as college choices. One of the students, Luis Garcia, who is bilingual, obtained a summer internship at the AT&T/Bell Labs making view graphs using PowerPoint for their South American market. AT&T benefited from Garcia's work, and he gained valuable experience in the business world. Clearly, this school/business partnership maintained by using the Internet has proven to be beneficial for everyone involved.

Argonne National Laboratory in Argonne, Illinois

Why are there magnetic fields? How does gravity get out of black holes? These are a few of the questions that kids send over the Internet to the Ask a Scientist Database sponsored by Argonne National Laboratory in Illinois.

Argonne National Laboratory—a Department of Energy Lab doing research in nuclear science, physics, chemistry, and the environment—is committed to its goal of enriching the education of teachers and students. Specifically, Argonne encourages students to become scientists—particularly students from underrepresented populations, such as female and minority students. Argonne works with teachers to assist them in teaching science, and in the last year has shown them how using the Internet can improve their science teaching. Argonne has been offering classes to help teachers learn how to get on the Internet, use it, and access all of the resources available for their students and themselves.

Through Argonne's computer bulletin board, Newton, teachers and students can ask a question and receive a response from scientists from across the country. They also can access a database of 10,000 questions that have been answered in the past year and a half. Sam Bowen is one of the scientists at Argonne who is involved with Newton. He finds that "[a]nswering the questions of these kids is really exciting and really a pleasure because these kids and teachers will ask questions that are just not something you ever thought about." Based on the feedback from his colleagues, Bowen feels that the scientists enjoy answering the questions as much as the students enjoy asking them.

Model High School in Bloomfield Hills, Michigan

At this Michigan high school, students are encouraged to take charge of their learning. Using his own initiative, one determined student researched the Internet and secured a grant that enabled his school to get connected. Since then, students have maintained the system and have taught other students and their teachers how to use it.

Model High School, set up as a research and development arm of the Bloomfield Hills School District, was designed to change the way students and teachers typically interact. As advocates of the philosophy of "teacher as coach," Model staff believe in empowering the students to assume a number of responsibilities in their school community. When thinking back on the integral role that the students played in getting Model connected to the Internet, Program Coordinator/Principal Cindy Boughner recalls, "It enabled students to take a mature kind of approach to being a part of a school community, to make immediate contributions, to reverse roles with us, to do a lot of peer coaching, and it enabled the teachers to learn how to be collaborators with the students."

One of Model's newest projects is called "Internet Safari," a multimedia tour created by a small groups of students. "Safari" explains the Internet, shows various kinds of resources available, and identifies tools that teachers can use to adapt learning in their classrooms. Using their collective knowledge and creative abilities, these students hope to show teachers and students the powerful impact that the Internet can have on learning.

As students actively work on a variety of projects, they collaborate with one another as well with others around the world. Boughner believes that the Internet has had a positive effect on learning and teaching in the school. "We haven't used it to replace teachers or to distance ourselves from students," she says. "We've used it to increase that interaction and to make more things possible in that interaction."

Steele Elementary School in Harrisburg, Pennsylvania

When Alda Hanna talks to her fifth grade inner-city class about collaborating with other classrooms, chances are she's not just referring to the ones in their building. Thanks to their connection to the Internet via the Great Lakes Collaborative server, her students can work with classrooms not only in other buildings, but in different districts. Hanna is strongly committed to preparing her students for the 21st century, and she has found that using the Internet has changed the way she teaches: "I've been teaching school for 30 years. Being connected to the Internet has changed me so drastically, I'm just not the same person. I now know that I don't have to have all the answers; I have access." When her students ask questions, Hanna can

find the answer by asking professionals in the field, although she encourages her students to network to find answers on their own. Hanna feels that she is a facilitator helping students to become lifelong learners.

Beverly Benfer, Great Lakes Collaborative Pennsylvania state facilitator, believes that it is critical that schools get connected to the Internet. "As they use the Internet, students are starting to learn interactively, and it's more thought provoking," explains Benfer. "They must think their way through a logical pattern to get to the information. They get a lot of raw material, but then they have to synthesize it and come up with the answers that they're searching for."

Benfer and Hanna both feel that having the Internet has helped the students stay interested in school. Hanna speaks of one student, Omar, who did not come to school at all one year. During the next school year, however, he was coming every day. Omar was excited about the technology that was now available in his classroom—technology that he could use by himself to research databases from all over the world. Hanna believes that having the Internet in her classroom helps prepare all of her students for a technological world.

Possible Funding Sources

After you have created an Internet access plan, you need to decide how to fund the connection. Access to the Internet may replace some of tools you might be funding in your media center or in your curriculum. For example, you may not need to purchase as many books. Instead, consider reappropriating funds. Also, you may wish to contact the following sources. Any one or a combination may be just what you need to get your school connected to the Internet.

- State Departments of Education
- Foundations
- Corporations
- Cable Companies
- Chambers of Commerce
- Local Businesses

Access Options Matrix

	Level One Dial-In Connection Without Internet Protocols 1200-9600 bps (Terminal Access Dial-Up) You are looking at the Internet through another computer.	**Level Two** Dial-In Connection With Internet Protocols 2400 bps-14.4k bps (SLIP/PPP) When you dial in, you become a temporary node on the Internet.	**Level Three** Direct Leased Line Connection 56K or T1 You are permanently connected to the Internet.
Pros	■ Good introduction to telecomputing ■ Can access from any location ■ Able to do following applications in text mode only: e-mail listservs newsgroups gopher	■ Graphical interface (slow) ■ File transfer of text and graphics is easy ■ Worldwide e-mail with easy-to-use document transfer capabilities ■ Access to text, graphics, video, and sound ■ Can access from any location ■ Able to be an information publisher (WWW pages) ■ Able to use following applications: All of Level One plus: Mosaic Blue Skies	■ Ability to have own servers ■ Graphical interface ■ File transfer of text and graphics is fast and easy ■ Worldwide e-mail with easy-to-use document transfer capabilities ■ Access to text, graphics, video, and sound ■ Able to be an information publisher (WWW pages) ■ Most cost-effective if whole district shares one connection through a WAN ■ Able to use following applications: All of Levels One and Two plus: CUSeeMe/video Maven/audio
Cons	■ File transfer may not be easy ■ Limited resources ■ Text only ■ Not possible to use following applications: Mosaic Blue Skies CUSeeMe/video Maven/audio	■ Requires higher speed computers and modems ■ Requires memory-intensive software ■ Downloading large files (audio and video) takes a long time ■ Not recommended or not possible to use following applications: CUSeeMe/video Maven/audio	■ Requires higher speed computers ■ Requires memory intensive software ■ Access only through LAN/WAN location ■ Requires additional people to support the network and servers

Start-up Cost	■ If using existing equipment and phone line— Only service provider subscription cost	■ High-speed modem ($200) ■ Newer computer equipment ■ Existing phone line ■ Subscription cost	■ LAN/WAN—about $3,000 per station if starting from scratch ■ Network connection—$8,000-$10,000 installation
Annual Cost	■ $0-$1,200 per user depending on subscription cost	■ $360 to $2,400 per user (Location is a factor.)	■ $6,000-$8,000 per district year (Location is a factor.)
Access Needs	■ Analog phone line ■ Subscription to service provider	■ Analog phone line ■ Subscription to service provider	■ Installed LAN ■ Dedicated point-to-point leased line or frame relay connection to Internet (56K or T1) ■ Hub ■ Routers-CSU/DSU ■ Network server optional ■ Network support person ■ Membership or license fee to Network provider
Hardware	■ Computer ■ Modem	■ Computer (286+ or Mac with System 7) ■ Modem (9600 bps or better)	■ Computer (286+ or Mac with System 7) ■ Network connectors
Software	■ Terminal software package or software from service provider	■ Access software (SLIP or PPP) ■ Internet tools: gopher, Mosaic, e-mail, telnet, FTP	■ Network software ■ Internet tools: gopher, Mosaic, e-mail, telnet, FTP
Training	■ Introduction to computers ■ Modems (setup and troubleshooting) ■ Use of terminal software (especially transferring files) ■ Curriculum integration	■ Introduction to computers ■ Modems (setup and troubleshooting) ■ SLIP or PPP access software ■ Internet tools: gopher, Mosaic, e-mail, telnet, FTP ■ Curriculum Integration	■ Introduction to computers ■ Internet tools: gopher, Mosaic, e-mail, telnet, FTP ■ Curriculum integration

Hints for Successful Staff Development

- Initiate a survey to determine your staff's technology experience in order to determine their training needs. Design your training around the information you gather from this survey.
- Make sure that every educator who is going to learn how to use the Internet and design information access skills within their curriculum knows how to access e-mail (electronic mail), use the gopher system (to navigate through the Internet), and download information and print it out.
- Train your staff in teams comprising administrators, teachers, library/media specialists, and computer teachers. These teams can then help themselves and help others in their buildings.
- Provide hands-on training in a lab, if possible, so staff can have their hands directly on a keyboard. If this type of training is not possible, use an overhead and a Liquid Crystal Display (LCD) panel to demonstrate "how to" skills. Then the individuals can go back to their buildings or wherever they have access to practice those skills.
- Provide technical support after the initial training either by e-mail, voicemail, telephone, or a person on site. Questions should be answered within 24 hours because the frustration level can be high.
- Follow up initial training with further training after your staff has had an opportunity to try out some of their new skills.
- Contact state departments of education or state technology agencies for lists of people and places that conduct training.
- Consider hiring a consulting firm to provide training if you are unable to secure the services of a nonprofit agency; however, make sure the firm has a good reputation.

Getting Connected to the Internet

Once you have decided that you want to connect your school to the Internet, there are many factors to consider.

A school's planning committee should have representation from administrators, teachers, parents, libraries, businesses, technical experts, and other community members.

You should think ahead and have a long-range plan to get your school completely networked. Then as you purchase new equipment, you can make sure that it all fits into your plan.

Contact other schools that are connected to find out what they went through and what issues they faced. Local colleges or universities can be a great resource. There are also Internet providers in every state—some of which are nonprofit—that can assist you. Below is a list of some service providers that can assist you in developing and implementing a technology plan for your school or district.

CICNet
ITI Building
2901 Hubbard Drive
Ann Arbor, MI 48105
Area Served: Nationwide
1/800/947-4754
313/998-6703

IHETS
957 West Michigan Street
Indianapolis, Indiana 46202-5184
Area Served: Indiana
317/263-8909

InforMNs
TIES
2665 Long Lake Road
Suite 250
Roseville, MN 55113-2535
Area Served: Minnesota
612/638-8786

MichNet
4251 Plymouth Road
Ann Arbor, MI 48105-2785
Area Served: Michigan
313/764-9430

MRNet
511 11th Avenue South
Box 212
Minneapolis, MN 55415
Area Served: Minnesota
612/342-2570

netILLINOIS
1840 Oak Avenue
Evanston, IL 60201
Area Served: Illinois
708/866-1825

OARnet
2455 North Star Road
Columbus, OH 43221
Area Served: Nationwide
614/728-8100

WiscNet Network Information Center
Division of Information Technology
University of Wisconsin, Madison
1210 West Dayton Street
Madison, WI 53706
Area Served: Wisconsin
608/262-4241

NCREL's Home Page

The NCREL Home Page (accessible from Mosaic or another World Wide Web browser at **http://www.ncrel.org/ncrel/**) is available now. From the NCREL Home Page, you have access to the following areas:

- Descriptions of NCREL programs and staff
- Upcoming NCREL events and ongoing activities
- NCREL's complete *Product Catalog*
- Abstracts of education products available from NCREL and others
- Activities in the seven-state region (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin)
- Useful Internet tools and information, including AskERIC, other regional laboratory servers, U.S. Department of Education servers, Eisenhower Math/Science Consortia, and EDU-LINKS
- NCREL's gopher and other Internet gophers

NCREL's Gopher

NCREL's Gopher can be reached at: **gopher.ncrel.org**
You will have access to the following areas:

- Full text of NCREL's *Policy Briefs*.
- Education Technology Planning and Funding Information
- Full text of articles from the Mathematics and Science Consortium and National-Louis University's newspaper, *Best Practice*
- Full text of articles in *Midwest Forum*, the twice-yearly newsletter of the Midwest Regional Center for Drug-Free Schools and Communities
- Ordering and bibliographic information on hundreds of education products available from NCREL and other sources
- Connections to other valuable education resources on the Internet

Helpful Products to Guide You

To help you with your technology planning, we recommend two NCREL publications:

Byting Back: Policies to Support the Use of Technology in Education,
by Rafael Ramirez and Rosemary Bell of NCREL, considers the implications of making technology an integral part of teaching and learning. In addition to providing an overview of education technology and technology policies, the authors make specific recommendations for federal, state, and local policymakers. They focus on the restructuring of education and the equity issues associated with the widespread use of technology, as well as the importance of planning for technology within the context of curriculum goals and student achievement. (122 pages)

CATALOG #1994 RPIC BB 94, $9.95

Designing Learning and Technology for Educational Reform,
by Beau Fly Jones, Gilbert Valdez, Jeri Nowakowski, and Claudette Rasmussen, North Central Regional Educational Laboratory, presents a framework that defines indicators for engaged learning and teaching that focus on authentic tasks, knowledge building in learning communities, and new roles for students and teachers focusing on co-investigation, and co-production of knowledge. Schools can have such tasks and roles without technology. Technology can, however, be used in ways that qualitatively redefine learning capabilities and resources, allowing students to explore new objects and universes, learn about and use new technologies, produce new kinds of knowledge, products, and services. The appendices provides some powerful tools to design, evaluate, and plan for educational reform. The framework explores policy implications. (123 pages)

CATALOG #1994 RPIC DLT 94, $9.95

To order these products, contact NCREL's Publications Department at 708/571-4700, or via Internet e-mail: info@ncrel.org.

Reference

Jones, B. F., Valdez, G., Nowakowski, J., & Rasmussen, C. (1994). *Designing learning and technology for educational reform*. Oak Brook, IL: North Central Regional Educational Laboratory.

Resources

Below is a list of some resource books that may help you as you begin your journey on the Internet.

Dern, D. (1994). *The Internet guide for new users*. New York: McGraw-Hill.

Estrada, S. (1993). *Connecting to the Internet: A buyer's guide*. Sebastopol, CA: O'Reilly & Associates.

Fraase, M. (1993). *The Mac Internet tour guide: Cruising the Internet the easy way*. Chapel Hill, NC: Ventana Press.

Fraase, M. (1994). *The PC Internet tour guide: Cruising the Internet the easy way*. Chapel Hill, NC: Ventana Press.

Gardner, J. (1994). *A DOS user's guide to the Internet: E-mail, Netnews, and file transfer with UUCP*. Englewood Cliffs, NJ: PTR Prentice Hall.

Gilster, P. (1994). *The Internet navigator* (2nd ed.). New York: John Wiley & Sons.

Hahn, H., & Stout, R. (1994). *The Internet complete reference*. Berkeley, CA: Osborne McGraw-Hill.

Kehoe, B. (1994). *Zen and the art of the Internet: A beginner's guide* (3rd ed.). Englewood Cliffs, NJ: PTR Prentice-Hall.

Kent, P. (1994). *The complete idiot's guide to the Internet*. Indianapolis, IN: Alpha Books.

Krol, E. (1994). *The whole Internet user's guide & catalog* (2nd ed.). Sebastopol, CA: O'Reilly & Associates.

Lambert, S., & Howe, W. (1993). *Internet basics: Your online access to the global electronic superhighway*. New York: Random House Electronics.

LaQuey, T., & Ryer, J. C. (1994). *The Internet companion: A beginner's guide to global networking* (2nd ed.). Reading, MA: Addison-Wesley.

Levine, J. R., & Baroudi, C. (1994). *The Internet for dummies* (2nd ed.). San Mateo, CA: IDG Books Worldwide.

Marine, A., Kirkpatrick, S., Neou, V., & Ward, C. (1994). *Internet: Getting started* (updated ed.). Englewood Cliffs, NJ: PTR Prentice-Hall.

Quarterman, J. S., & Carl-Mitchell, S. (1994). *The Internet connection: System connectivity and configuration*. New York: Addison-Wesley.

Sachs, D., & Stair, H. (1994). *Hands-on Internet: A beginning guide for PC users*. Englewood Cliffs, NJ: PTR Prentice-Hall.

Glossary of Terms

access	The ability to send/receive information via modem
account	Arrangement between the service provider and the user that gives the user a unique name and address on a computer network
address	Location as in "e-mail address"
Archie	Tool used to search the Internet; name refers to archive
archive	Collection(s) of files; sometimes refers to a saved file
ASCII	The American Standard Code for Information Interchange; machine code for computer information
BBS	Acronym for Bulletin Board System
Blue Skies	A graphical interface program for weather information
bps	Data transfer speed measured in bits per second
bulletin board	Computerized system open to the public for reading and posting messages
chat	To "talk" with other users online
client	A program or computer that is able to share the resources of another program or computer called a server
connect	To go online via a modem
CSU/DSU	Type of modem on a network connection
CUSeeMe	Software developed at Cornell University that allows users to teleconference with one another
dedicated line	Usually refers to a hard wire connection between two computers, i.e., LAN
dial-in	A connection, usually made via modem, between two computers (or servers) over standard voice grade telephone lines
discussion group	A network group that discusses a specific topic online
download	The process of receiving entire files from another computer

e-mail	Electronic mail—a system that lets people send and receive messages with their computers
ethernet	A LAN (Local Area Network) cabling system
FAQ	Refers to a list of Frequently Asked Questions
frame relay connection	A virtual connection between one network router and multiple predefined network routers
freeware	Free software—often available online
FTP	File transfer protocol; a program or tool used to retrieve and send files
gateway	Computer that switches from one host to another
gopher	Method for getting from one place to another on a network
host	The computer where the main program or network resides
hub	Computer networks are connected together through hubs
IP	Short for Internet Protocol; the standard protocol used by systems communicating across the Internet
icon	A small picture depicting a specific item on a computer
(The) Internet	The international network of networks
LAN	Local Area Network; usually connects computers within one room or one building
leased line	A telephone line that is leased from the telephone company that establishes a permanent connection between two locations
listserv	Online Special Interest Group for specific topics, which is accessed through e-mail
login	The procedure used to sign on a user to a host computer
Maven/audio	A program that allows you to send sound files over the Internet
menu	Table of contents for a network
modem	Device that allows a computer to send/receive data via a phone line

Mosaic	A program that lets you access information on the World Wide Web
navigate	To use a program to move through the Internet
newsgroup	Discussion group where people leave messages for others to read
network	Computers connected by modems, wires, and/or software
node	Individual user/device on a network
PPP	Short for Point to Point Protocol; a Protocol used to establish TCP/IP connections using serial lines such as dial-up telephone lines
post	To publish a message on a network—e.g., sending a message to a newsgroup so that many users can read it
prompt	The place where you enter commands
protocol	Rules used for data transmission on computers
real time	Simultaneous communication between people and computers
remote access	Connect an outside computer to a network using a modem
router	Equipment that switches information from one network to another
server	The host computer or computer where all of the programs are stored
shareware	Low cost software where the fee is paid directly to the programmer
SLIP dial access	Serial Line Interface Protocol; type of computer connection via modem
TCP/IP	Transmission Control Protocol/Internet Protocol; control information a computer needs to communicate via modem
telnet	Connect to a remote computer through a network
terminal dial-up access	Using a central computer host for connection to the Internet as well as for storage space and processing power
upload	Transfer files from your computer to another computer

user	The person on the computer
Veronica	Very Easy Rodent-Oriented Netwide Index to Computerized Activities; a gopher search tool
WAIS	Wide Area Information Server; a tool to search the Internet libraries
WAN	Wide Area Network; a network over a large area
WWW	World Wide Web; a hypertext system where users can search through linked documents in any path they choose